

# Product Information Bulletin 239

## **PlastiSpan Insulation as a Roof Assembly Component**



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## PlastiSpan Insulation as a Roof Assembly Component

The purpose of this bulletin is to address misleading information that is currently being circulated by the Polyisocyanurate Insulation Manufacturers Association (PIMA), the polyisocyanurate insulation industry trade association based in the United States, and its members related to foam plastic insulation used as a component in roof assemblies.

The bulletins contain several inaccuracies related to the following issues:

1. Although the bulletins have been circulated in Canada as well as the United States, they fail to recognize significant differences between Canadian and US code requirements.
2. The bulletins provide various incomplete and inaccurate information with regard to FM Approvals listed roof assemblies, EPS insulation test results for surface burning characteristics, mechanical fastening requirements for foam plastic insulations and material properties required for roof insulation.

Canadian and US Building Code requirements for foam plastic insulation used in metal roof deck assemblies are as noted in the table below.

Code References	Requirements
<b>National Building Code of Canada 1995 (NBC 1995)</b>	
<b>Article 3.1.14.2. Metal Roof Deck Assemblies</b>	Sentence 3.1.14.2.(1) permits the use of foam plastic insulation in a roof deck assembly that has been tested in accordance with CAN/ULC-S126-M, Standard Method of Test for Fire Spread Under Roof-Deck Assemblies.
	Sentence 3.1.14.2.(2) waives the above requirement provided any one of the following conditions is met: a) the foam plastic insulation above the roof deck is protected by an acceptable thermal such as 12.7 mm thick gypsum board b) the building is sprinklered throughout, or c) the roof assembly has a minimum 45 min. fire-resistance rating.
<b>2003 International Building Code (IBC)</b>	
<b>Section 2603 Foam Plastic Insulation</b>	Section 2603.4.1.5 permits the use of foam plastic insulation in roof assemblies provided one of the following conditions is met: a) the foam plastic insulation is separated from the interior of the building by wood structural panel sheathing not less than 0.49 (11.9 mm) thickness or any approved thermal barrier, or b) the foam plastic insulation can be applied direct to metal deck if it has been listed as a component in a Class A, B or C roof covering assembly that has passed FM 4450 or UL 1256 testing.



The primary difference between Canadian and US code requirements to note relates to recognition in the NBC 1995 that foam plastic insulation may be placed directly above a metal deck without a thermal barrier when the building is sprinklered throughout. Since sprinkler systems are commonly used in commercial building applications, Sentence 3.1.14.2.(2) permits the use of PlastiSpan insulation as a component in a roof assembly without a thermal barrier in many applications.

For US code applications it should be noted that the IBC provides recognition for roof assemblies tested in accordance with either FM 4450 or UL 1256. A number of EPS insulation manufacturers have completed testing in accordance with UL 1256, a test method developed by Underwriters Laboratories Inc. (UL), a recognized leader in the investigation of fire issues.

It is important to emphasize that if a specific project requires a Factory Mutual (FM) approved roof assembly, a roof assembly complying with the latest edition of the FM Approvals Guide must be provided. PlastiSpan insulation is listed as a component in a number of FM approved roof assemblies that will provide 1-60 or 1-90 wind uplift resistance. For information on FM approved assemblies, see the Plasti-Fab PlastiSpan insulation technical brochure regarding fire-rated roof assemblies.

Another significant difference between NBC 1995 and 2003 IBC requirements relates to test methods used to characterize surface burning characteristics for foam plastic insulation materials. The applicable test requirements for ratings of foam plastic insulation are identified in the table below.

Code Reference	Test Method
<b>National Building Code of Canada 1995 (NBC 1995)</b>	
<b>Article 3.1.12.1. Flame-Spread Rating and Smoke Developed Classification - Determination of Ratings</b>	Sentence 3.1.12.1.(1) requires the use of CAN/ULC-S102-M, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies, for thermoset foam plastic insulation such as polyisocyanurate insulation. As per CCMC evaluation listing 13104-L, the flame-spread for JM AP Foil-Faced polyisocyanurate insulation is 450.
	Sentence 3.1.12.1.(2) requires the use of CAN/ULC-S102.2-M, Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering, and Miscellaneous Materials and Assemblies, for thermoplastic foam plastic insulation such as PlastiSpan insulation. As per CCMC evaluation listing 12424-L, the flame-spread rating for PlastiSpan insulation is 290.
<b>NOTE:</b> PlastiSpan insulation is labelled as delivered to customers with flame spread and smoke developed rating determined in accordance with CAN/ULC-S102.2. Purchasers should look for surface burning characteristics determined in accordance with the appropriate Canadian test method as noted above.	
<b>2003 International Building Code (IBC)</b>	
<b>Section 2603 Foam Plastic Insulation</b>	Section 2603.3 requires the use of ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.  Flame-spread ratings for both polyisocyanurate and EPS insulation are listed at less than 25.



As can be seen, the CAN/ULC and ASTM test methods yield significantly different flame-spread ratings for both EPS insulation and polyisocyanurate insulation. However, the important point to note is that the suitability for a particular roof application is typically determined based upon testing of a complete roof assembly with the insulation as one component.

The bulletins circulated by the polyisocyanurate industry also infer that the fastening of EPS insulation within a roof assembly using mechanical fasteners may pose a problem. It should be noted that the use of mechanical fasteners is recognized in FM Approvals listed roof assemblies containing EPS insulation.

With over 35 years of successful use the insulation component in roof assemblies, PlastiSpan insulation continues to be the insulation chosen for a wide variety of new roof and re-roofing assemblies. The material properties of moulded expanded polystyrene (EPS) insulation (see article ***The Benefits of EPS Roof Insulation***, Construction Canada magazine, January 2004, for detailed review of EPS insulation performance characteristics) and its cost effectiveness make it an ideal choice for many roof applications.